

ABSTRACT OF THE DISCLOSURE

The invention is directed to a method and device for routing, mixing, or reacting droplets or liquid microstreams along the surface of a flat substrate. The flow of liquid microstreams or microdroplets along designated pathways is confined by chemical surface patterning. Individually addressable heating elements, which are embedded in the substrate, can be used to generate flow via thermocapillary effects or to trigger or quench chemical reactions. The open architecture allows the liquid to remain in constant contact with the ambient atmosphere. The device can be used for microfluidic applications or as a surface reactor or biosensor, among other applications.